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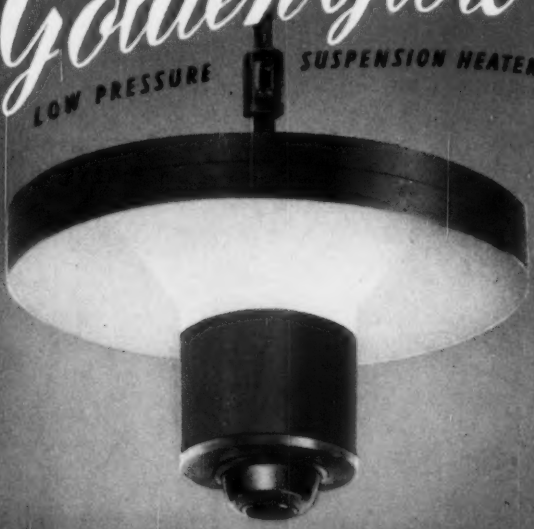

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GAS HEAT *in* INDUSTRY

Vol. XIV November, 1950 No. 158

CONTINUOUS ALUMINIUM STRIP MILL

Gas Helps The Northern Aluminium Company's New Plant at Rogerstone

THE Northern Aluminium Company's new continuous strip mill at Rogerstone, opened on 21st September, by the Minister of Supply, the Rt. Hon. G. R. Strauss, combines high-speed rolling with efficient mechanical handling to achieve the aim of maximum output at minimum cost. Some idea of the extent to which handling has been reduced can be gauged from the fact that it is expected that the output per man will be five times as great as the best that has been attained hitherto in this country, by mills making similar products.

Site History

The history of the site chosen for this plant is interesting. In the year 1772 a copper works was started by the Royal Mint Company among the ruins of a 12th Century castle. Later it became a steel and tin plate works and was subsequently taken over by Guest, Keen and Nettlefold for the production of rod, wire and nails. Between the wars, the works fell into disuse but, just prior to World War II the Government, persuing its policy of locating industry in what were then regarded as distressed areas, chose the site for the manufacture of aluminium products. The plant was erected in 1939 and worked throughout the war for the Ministry of Supply, from whom it was purchased by the Company in 1945.

Adequate space was available for

MAIN FEATURES IN THIS ISSUE

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extensions, and the advantages which originally located the works at Rogerstone would benefit any new plant. These advantages include availability of labour, the proximity of collieries and carbonising plants for the provision of coal, coke and gas, adequate electricity supply, abundant soft water suitable for process use, and excellent road and rail facilities linking with the Bristol Channel ports where raw material from Canada is unloaded. Furthermore, an important consideration where heavy plant is to be installed, the subsoil is such that piling is unnecessary.

The present output of the new plant, which was erected at a cost of three and a half million pounds, is 50,000 tons per annum of sheet material, which represents an increase of no less than 35 per cent. of the country's present capacity.

The Process

The ingot for rolling, either imported from Canada, or cast in the remelt department, is first "scalped" to remove surface roughness. After pre-heating it is passed down the hot line for successive hot rolling through two independent reversing mills, followed by two hot-finishing mills operated in tandem, being end-sheared and side-trimmed in process before being coiled at the end of the line. After cooling, the coil is then transferred to the cold-rolling mill where it is passed through three mills operated in tandem. Subsequent treatment depends on the use for which the sheet is required.

Coil intended for building sheet is passed to the heavy shearline where it is flattened, cut to length and corrugated if required. Coil for any other purpose passes on to a slitter where it is edge-trimmed or slit into strips. If intended for "circles" for holloware, it goes to the circle mill where the discs are cut on a blanking press. Other material is put through the annealing furnace.

After annealing, foil stock is in the condition required by the customer but container sheet is rolled to the required hardness in a temper mill before being delivered to a continuous-type light shear line for degreasing, edge trimming, checking for gauge and quality, cutting to length, and finally sorting.

The plant has been laid down to the general specifications of the company's own engineers, who have supervised the installation.

Pre-heat Furnaces

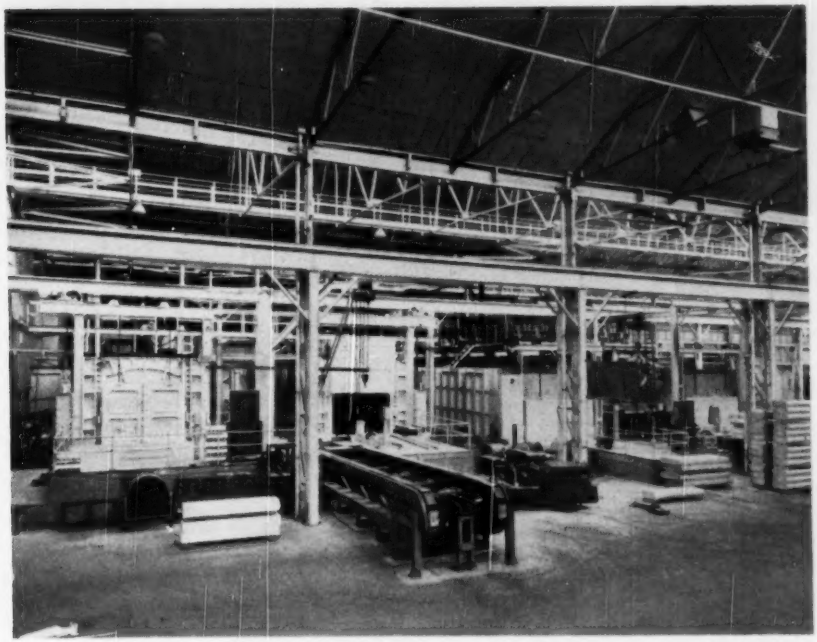
Pre-heating plant includes two Priest gas-fired furnaces.

Each Priest furnace has a single arched chamber 51 ft. 3 in. long, 9 ft. wide and 6 ft. high to the spring of the arch (7 ft. 3 in. to the centre). There are forty chairs each 30 in. long and 26 in. wide arranged in two rows in each furnace, though as those nearest the discharging door are normally left unloaded during the heating, only thirty-eight are effective. Ingots up to 9 in. by 48 in. by 96 in. long can be accommodated in a single row of nineteen; smaller ingots, four on each chair in double row formation, may number up to 152, the limiting weight per chair being 205 lb.

Producer gas, of a calorific value of 185 B.Th.U. per c. ft. is fed through a main stop-valve and a solenoid-operated cut-off valve to eight ducts, one to each zone of the furnace. The zone nearest the charging doors has three burners, the remainder four. Air for the burners is delivered through separate ducts by a 25 in. diameter Sirocco fan, rated at 1,850 c. ft. per minute at 8 in. w.g. and driven directly at 1,455 r.p.m. by a 6 h.p. A.C. motor. Air and gas ducts to each zone are primarily controlled by manual valves, but an independent by-pass on each duct is fitted with a motor-driven valve, governed by a controller, of which there is one for each zone, responding to a thermocouple in the chamber roof.

Hot gases from the burners, which are at the foot of the chamber walls, pass through a horizontal duct to mix with recirculated gases in a vertical duct leading up through the wall to the space above the chamber arch. They pass down through openings in the arch, over the ingots and out through holes in the floor of the chamber into a central flue leading to the recirculating fan. This is a 40 in. dia. fan by Keith Blackman Ltd., driven at 1,460 r.p.m. by a 50 h.p. A.C. motor delivering 22,800 c. ft. per minute at 1½ in. w.g. (at 550° C.). The gases are discharged into two flues under the chamber walls and pass upwards through dampers to meet the burner gases. Spillage is taken from the furnace by two cast-iron stacks at the discharging end. One stack is fitted with a "Mono" carbon dioxide recorder.

The doors are of hematite cast iron, packed with insulating brick, and are counter-balanced. The discharging door is in two sections, dovetailed together, which may be lifted independently to expose the end of one row of chairs. At the loading end the door is in one piece. Door lifting is done by 5 h.p. A.C. motors driving the lifting chain sprockets through a reduction gear.



Pre-heat furnaces at Rogerstone. The Priest gas-fired furnaces can be seen on the left of the photograph

A gas-fired air circulation furnace, built by Priest Furnaces Ltd., is provided for annealing metal that requires rolling additional to that received in the Tandem cold mill. It has an annealing capacity of 7½ tons per hour.

Heating

The furnace is heated by means of hot air, recirculated through special Newton needle heat exchangers placed on the side of the

furnace at ground level, the preheating and soaking zones each being provided with a separate heater and blower. In the case of the preheating zone, air is blown through the heater leaving at 500° C. maximum, and in the case of the soaking zone the air leaves at a temperature of 560° C. maximum. The air is then passed through ducts into the cavity formed by two arches running at high level the full length of each zone. It passes down through ports in the lower arch over the load and is exhausted below each tray, through controlled ports, into two flues. The flues lead into a main flue which is connected to the inlet side of the blower fans.

Consumption

Each combustion chamber is fitted with four Priest low pressure turbulent gas burners, each fitted with gas and air controls. A mixture of producer and coke oven gas is used. This supply is taken from the existing works mains and has an average calorific value of 185 B.Th.U. per c. ft. Under full load conditions the approximate gas consumption for heating the charge is 60,000 c. ft. per hour. A Negretti pressure controller is fitted for controlling the burner supply, also provided is a solenoid gate-valve which shuts off the gas in the event of a power failure on the blower fan.

Primary air for combustion is supplied at the rate of 3,000 c. ft. per minute, against 7½ in. w.g., by means of a 16 in. dia. Sirocco steel-cased single-inlet blower fan, direct coupled to a 7½ h.p. 1,440 r.p.m. A.C. motor. It is preheated by passing through a section of the recuperator. A similiar type of fan is provided for exhausting the products of combustion; this has a duty of 6,000 c. ft. per minute, against 1¼ in. w.g. at 180° C. and is driven through a V belt drive by means of a 5 h.p. 950 r.p.m. A.C. motor.

The preheating zone fan is a 40 in. dia. Sirocco single inlet HE.35 induced draught fan and is capable of handling 25,000 c. ft. per minute at 225° C. and 7½ in. w.g. It is driven by a direct coupled 70 h.p. 980 r.p.m. A.C. motor. The fan for the soaking zone is 4½ in. dia. Sirocco single inlet similar to that used on the preheating zone, and is capable of handling 28,000 c. ft. per minute at 360° C. against 6 in. w.g. and direct coupled to a 70 h.p. 980 r.p.m. A.C. motor. With the exception of the primary combustion air fan, the fans are provided with lubricated gunmetal lined water-cooled bearings and are designed for working under conditions of high temperature. All ducting, fans and exposed surfaces are lagged with asbestos magnesia plastic insulating material. The lagging and the furnace casing have been painted with two coats of heat resisting aluminium paint.

Control

To avoid uneven heating of the load, thermocouples are fitted at frequent intervals in each zone; necessary adjustment is made by dampers which control the recirculated air where it is exhausted through low level ports. Thermocouples are also provided at various points in the combustion chamber, heat exchangers and recirculating ductwork. The following instruments are provided for accurate control of the furnace and are contained on a single instrument panel:

Five Foster six point temperature recorders for giving direct measurement of the temperature in the furnace and combustion chambers.

Two Foster controllers, for the control of the gas and air supply to the burners.

Two Electroflo, Model 488, integrating and recording flow meters for metering the gas and air supply.

One Negretti and Zambra air-operated pressure controller for controlling the pressure of the gas supply to the burners.

Two Monameters for measuring

the gas and air pressure.

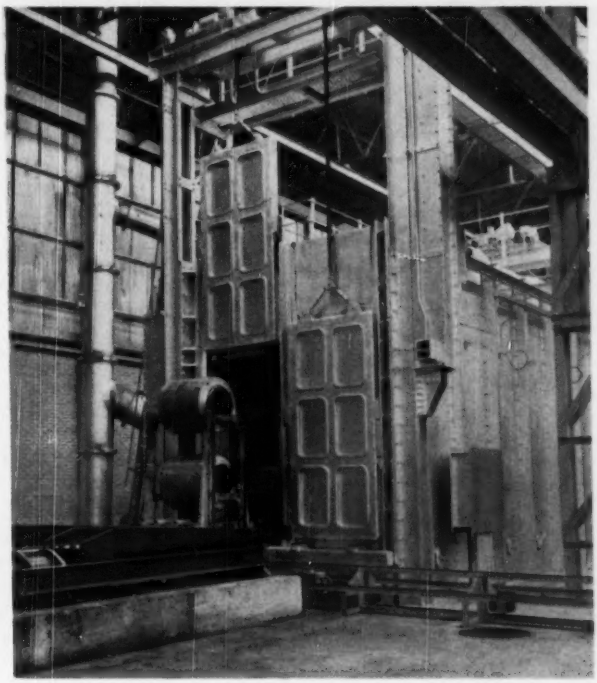
Construction

The general construction of the furnace and combustion chamber follows the usual practice. The main casing consists of $\frac{3}{8}$ in. M.S. plates supported by 12 in. by 5 in. R.S.J. backstays held together by tie-rods across the top of the furnace. The chambers are lined with 9 in. "Thistle" quality refractory brickwork with side walls insulated with 9 in. "Economite" insulating material; the paving with $4\frac{1}{2}$ in. solid grade insulation, and the roof with $4\frac{1}{2}$ in. of Darlington and $4\frac{1}{2}$ in. of solid grade insulation.

Both sets of charging and discharging doors are constructed in hematite iron castings with insulated brick panels. The internal doors separating the preheating and soaking zones are also constructed in hematite cast iron, but in this case they are a solid casting (no panels being used). Each door is 15 cwt. heavier than its counter-weight and is operated at 25 ft. per minute by individual motorised lifting gears, with two lifting chains on sprockets driven through a slipping clutch and a worm reduction unit. This equipment is mounted at high level above each door on a steel platform and has been designed to operate in the conditions expected above the furnace.

Limit switches are provided to limit the door travel. The switches are combined with a brake pulley embraced by a magnetic brake and the limits are interlocked with the hydraulic system so that the pump will not operate while the doors are closed.

Each chamber of the preheating zone is 4 ft. 4 in. by 37 ft. 9 in. long with a height of 5 ft. 9 in. from skid rails to the perforated plate forming the discharge ports, and will hold ten trays. The soaking zone chambers



The gas-fired air circulation furnace for annealing metal that requires rolling additional to that received in the tandem cold mill

are similar, but 41 ft. 6 in. long and will each hold eleven trays. Altogether, seventy trays are provided for the load, each being 3 ft. 9 in. long and capable of holding two coils, of maximum size 38·6 in. dia. by 30 in. long, carried one above the other. The original trays were fitted with axles and wheels, but in the light of past experience it was decided to employ metal sliding faces to reduce maintenance.

Handling

Handling equipment comprises a main loading conveyor, traverse cars and haulage between the furnace and the loading conveyor, and double hydraulic pushers and extractors on each end of the furnace for charging and discharging the trays in each chamber.

The main loading and return conveyor is situated in the cold mill for easy crane access, and extends the full length of the furnace. This conveyor consists of twin skid rails, suitably stayed and supported through its entire length. The trays are pushed along this track by means of a broadbent ten ton electric screw pusher which is driven at 720 r.p.m. by a 30 h.p. totally enclosed slip ring A.C. motor through a single reduction unit. The screw has a buttress thread and is carried in bronze-lined bearings, with a ball thrust bearing arranged to take the thrust in both directions.

Two electrically operated traversers are provided at the charging and discharging end of the furnace. The driving unit is a 1½ h.p. high-torque A.C. motor, running at 700 r.p.m. with a worm reduction unit, traction sheave, wire ropes, return sheaves and rope tensioning gear.

The coils, wound on 16 in. dia. spools at the slitter, are loaded on to the empty trays on the main conveyor six at a time by the standard coil lifting beams. A Fielding and Platt hydraulic extractor, giving 35 tons thrust over a 6 ft. stroke, is located at one end of the conveyor This hauls loaded trays on to the traverse car of the cross haulage. The car then moves up to the charging end of the furnace, stopping in front of the chamber selected. Twin Fielding and Platt hydraulic pushers situated opposite each furnace chamber, push the loaded trays through the furnace one tray pitch at a time. Each pusher is capable of giving a 35 ton thrust over a 6 ft. stroke.

At the discharge end of the furnace, the trays are withdrawn by means of twin Fielding and Platt hydraulic extractors which pull the trays on to another traverse car; this car then traverses across to the main loading conveyor where the Broadbent pusher moves the tray off the car and on to the conveyor for unloading. At the same time, a loaded tray is pushed off the conveyor and on to the charging car at the opposite end ready for charging into the furnace. This completes the cycle.

The hydraulic system normally operates at 2,400 lb. per sq. in. The pump is by Fielding and Platt, size H3, totally enclosed, and pressure lubricated, with 3 single-acting rams 1⅜ in. dia. by 3 ft. stroke. It runs at 380 r.p.m. to produce 2 ton per sq. in. and is driven through V belts by a 70 h.p. 980 r.p.m. A.C. motor. All the pipework is fitted with Ermeto high pressure fittings. The system is completed by pressure relief valve gauges, stop and control valves.

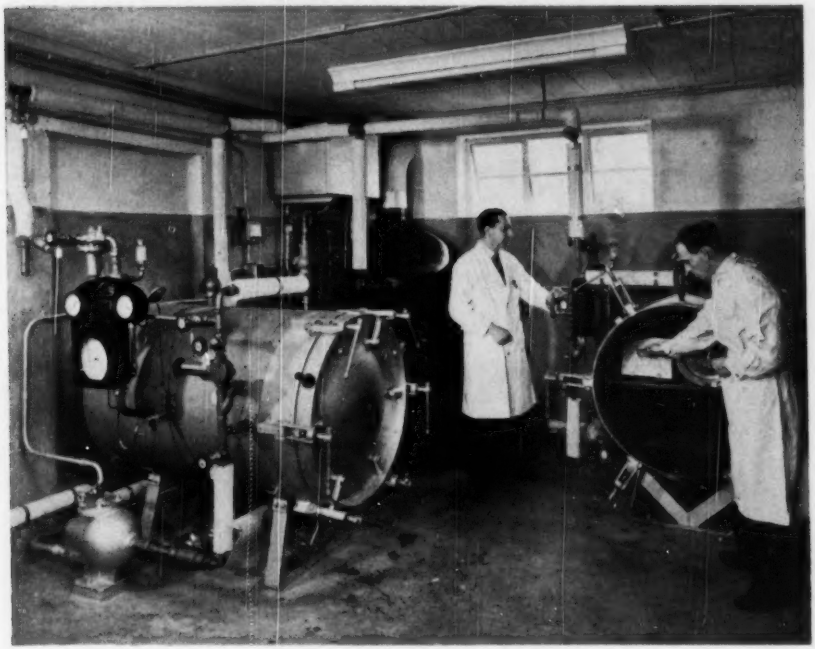
BRITISH THERMOSTAT CO. LTD.

FOR one month, namely the 13th November to the 13th December, window space has been taken for an exhibit at the Engineering Centre, 351 Sauchiehall Street, Glasgow, C.2, which is in addition to a permanent exhibit at the Centre on the first floor, where there is the display cabinet featuring the company's range of automatic control equipment.

HERTFORD COUNTY HOSPITAL

Uses Gas Continuously

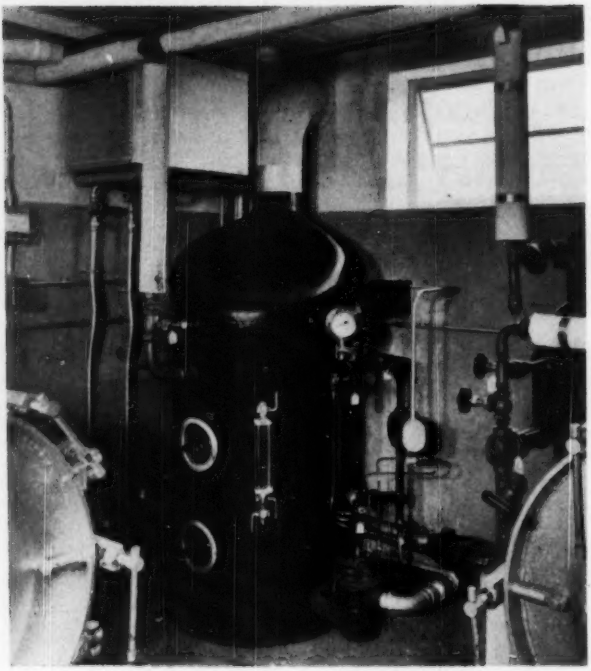
DR. Therm may not be listed as a National Health Scheme practitioner, but there is no doubt that the use of his services at many hospitals throughout the country fully entitles him to claim a major rôle in aiding the recovery and comfort of patients, as well as the comfort and convenience of the staff. At the County Hospital at Hertford, for instance, the uses of gas vary from the quiet small flame of the Bunsen burners in the dispensary to the roar of the boiler in the sterilising room.



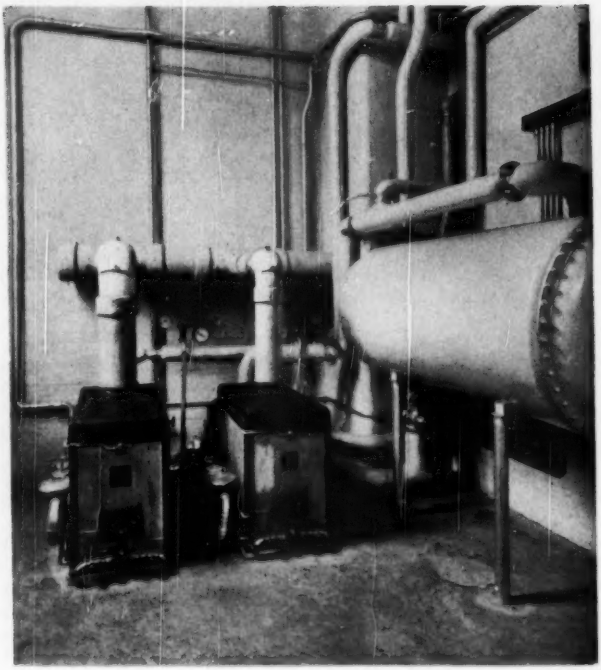
The autoclaves under the watchful eyes of the hospital's chief pharmacist and an assistant

Both in the hospital itself and in the staff quarters, gas is used for a large variety of purposes. There are, for instance, sixty-five gas fires fitted in these buildings, of types varying from the three-unit Portcullis to the seven radiant Desmond fires. In the new annexe for nurses which was opened last winter a Series 1 Potterton Rex boiler has been installed for heating purposes, and a four-section D. Series boiler provides hot water for baths, etc. This installation necessitated the fitting of a 1,200 c. ft. per hour main meter and the running of 300 ft. of 3 in. supply to reach the boiler house. In addition, a Cannon K.509 cooker in green and cream has been fitted in the annexe section.

In the hospital kitchen, gas plays a major part. There are four roasting ovens, an eighteen burner hotplate, three 30 gallon vegetable boilers, a stock-pot stove, a double-ovened



The steam boiler recently installed in connection with the new sterilising plant



Gas-fired boilers which supply the heating and hot water requirements in the new annexe

steamer and a 6 ft. hot closet. Water for the pots of tea which accompany the meals has been provided by two Stott face boilers, two Ufix café boilers and four bulk water heaters, which are situated at convenient places throughout the building. All dressings at the hospital pass through a new sterilising plant which was put into operation a few months ago. It consists of a controlled flame 7S vertical gas-fired steam boiler which provides the necessary steam to operate two Manlove Alliott autoclaves and a Manesty still. The gas-fired equipment in this sterilising station at the front of the main building also includes an Ascot 38 multipoint water heater and several Bunsen burners.

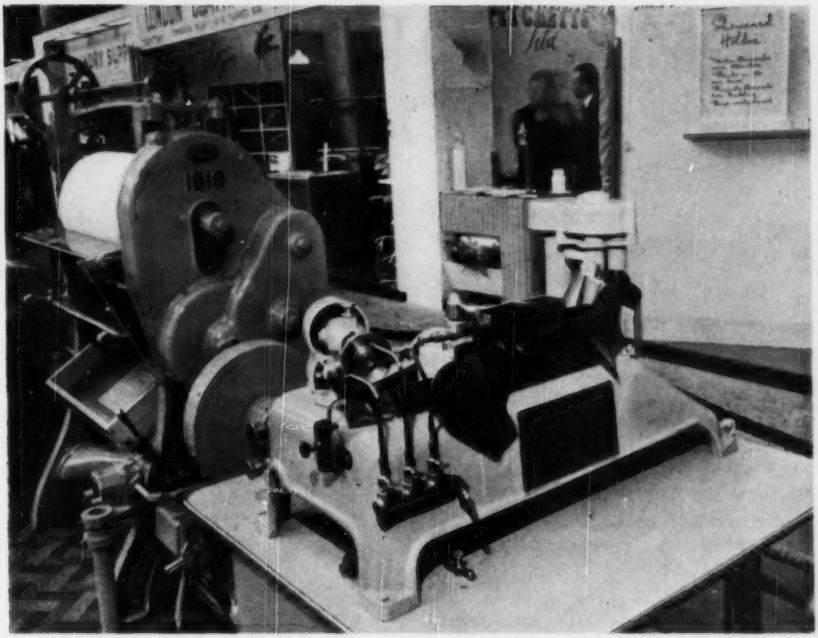
The gas consumption at the hospital averages nearly 50,000 therms (approximately ten million c. ft.) of gas each year. Apart from appliances already mentioned, twenty-one sterilisers and the same number of cookers are fitted in the various wards to provide immediate service, so that in all there are about 150 individual appliances in almost continual use. All this equipment is regularly serviced under an agreement recently drawn up with the Eastern Gas Board (Tottenham Division) which is only too anxious to assist in the work of a hospital which has 171 beds, a nursing and auxiliary staff of 180 and an administrative staff of twenty-two, with an outpatients department which has to deal with an average of 50,000 attendances every year.

THE BAKING OF CRUMPETS

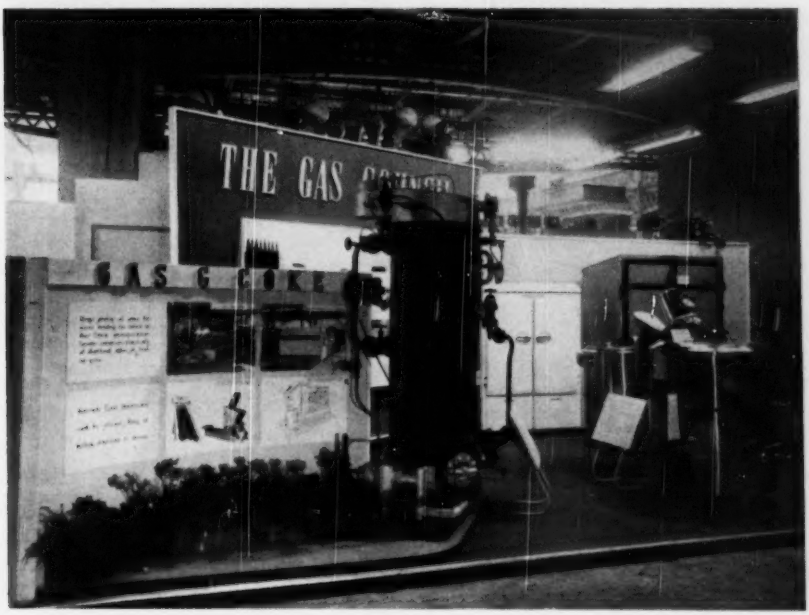
In the October issue of "Gas Heat in Industry," we gave details of an installation of hotplates designed for the baking of crumpets. Each hotplate accommodates 364 loose rings (3¼ in. dia. by ⅞ in. deep) in rows of seven, and into these is placed the required amount of dough, by a semi-automatic device known as a depositor. This is shown in use, in the above illustration

AROUND THE EXHIBITIONS

Two views of the Gas Council stand at the Laundry, Dry Cleaning and Allied Trades Exhibition. Above on the left can be seen the gas-heated drying tumbler (James Armstrong and Co. Ltd.) and in the centre a new burner design for the internal heating of Calendar rolls



Above. Also at the Laundry Exhibition and on the stand of Isaac Braithwaite and Sons can be seen an automatic shirt and collar ironer, handling between 600 and 800 collars an hour. Below. Gas and coke in agriculture was the theme of an illustrated panel on The Gas Council Stand at the Dairy Show, while in the foreground is a Crane steam boiler and two pasteurisers



SPACE HEATING WITH CLEAN GAS

Possibilities for Ceramic Firing

TOWNS gas has proved itself to be a most economical method of space heating. However, since towns gas contains invariably a proportion of sulphur bearing compounds, this has meant that gas appliances burning towns gas have not been recommended in enclosed spaces. As would be expected, this has placed a limitation upon the use of towns gas as a heating medium and expensive arrangements have been made in the past whereby the products of combustion are either conveyed to a flue or else the burning of the gas itself has been used as a heating medium for circulating water, generating steam, or even heating air. The loss in efficiency arising from this conversion is obviously great.

Purifying Medium

Some time ago, this problem was investigated in the Bristol area, and arising out of this was the formation of a company to develop the system employing a purifying medium known as "Carbocell," manufactured by the National Smelting Corporation. This latter company conducted a prolonged series of tests in the development of this material, including a space heating installation where several hundred thousand c. ft. of gas were burned and the atmosphere produced thoroughly examined.

To state the case from the beginning, the main sulphur-bearing compounds from towns gas, carbon bisulphide and sulphur trioxide, although present in purified towns gas to but a small extent, if gas containing these compounds is burned, they may tend to produce a deleterious effect upon the health as well as an adverse effect upon the comfort of those who breathe the fumes so produced.

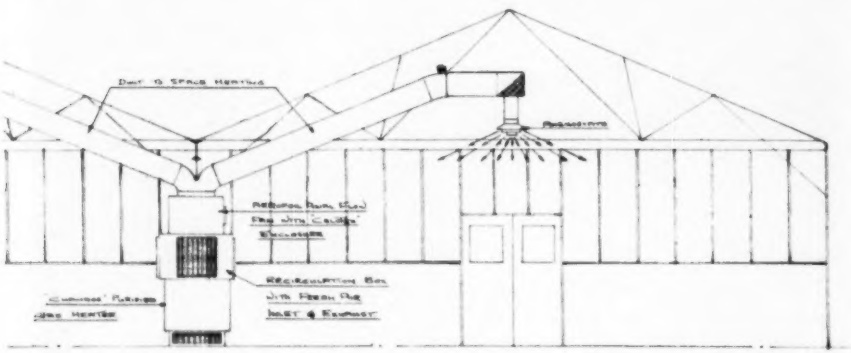
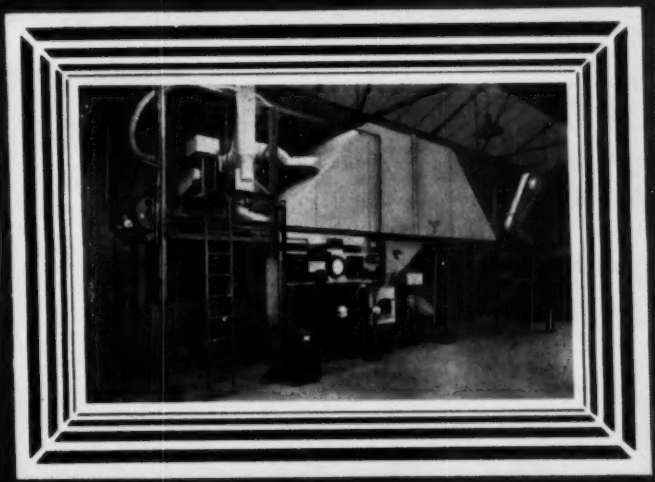


Fig. 1. Diagrammatic layout showing heat source to one section and lead to another

INDUSTRIAL OVENS



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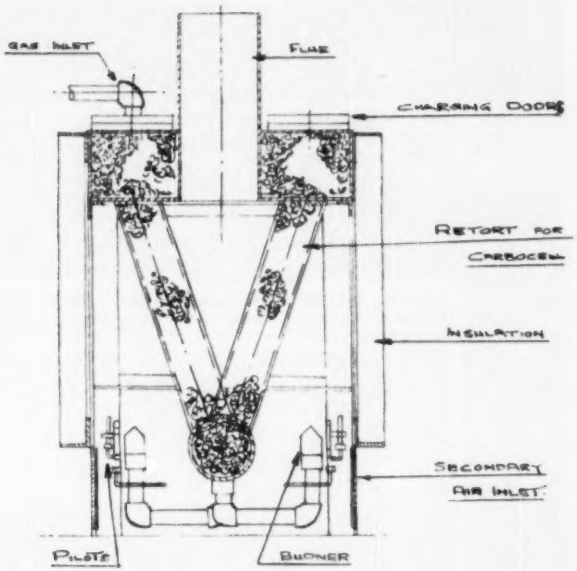
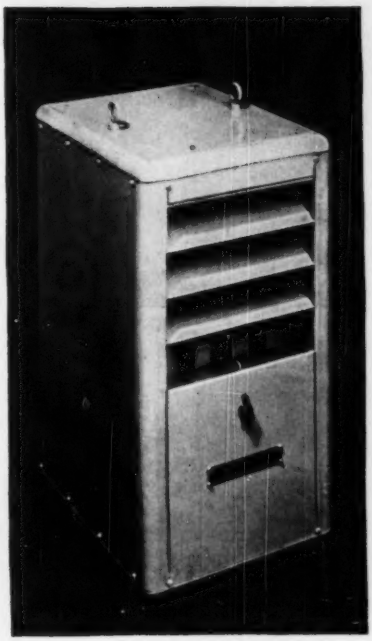


Fig. 2. Cross section through heater and purification unit

Fig. 3. General view inside the factory showing heater unit in the background

HARRIS



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Now there has been developed a compound which when heated will absorb the sulphur bearing compounds in the towns gas and reduce it from 20 grains per 100 c. ft to 1 grain. By the use of this process the products of combustion arising from burning towns gas anywhere in the British Isles are quite innocuous in so far as the operative in a factory or the child in school is concerned.

An Actual Installation

We had an opportunity quite recently of visiting one of these installations at Joinery and Insulation Co. Ltd., Thames Road, Barking, installed by the Chandos Engineering Co. Ltd., of 17 High Street, Egham, Surrey, the company which is manufacturing the "Chandos" heater which is here employed.

The factory is assembling wooden insulation cabinets. The floor space is approximately 6,500 sq. ft. with the offices at one end of the building. The unit assembly containing the gas burners is at the other end from the office, and consumes an average of approximately 600 c. ft. of gas per hour. The installation is designed to raise the temperature in the building from 30° to 60° F.

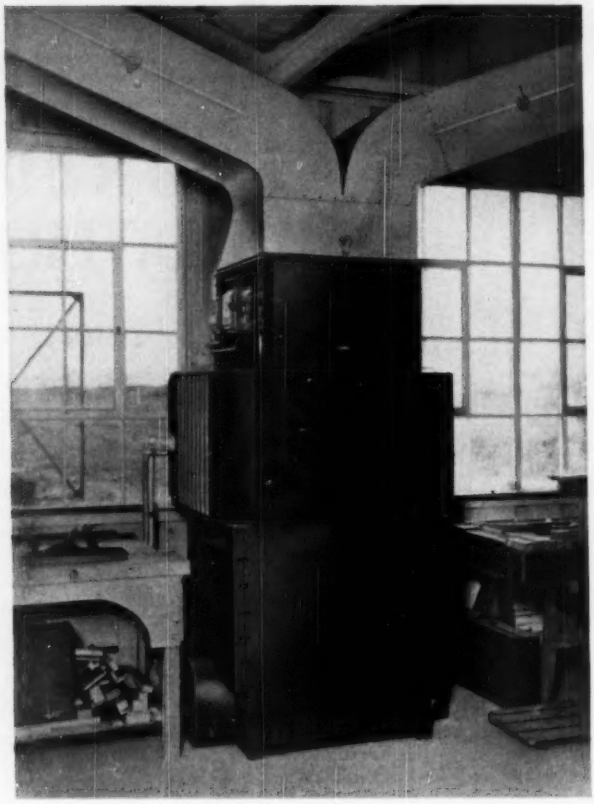

Fig. 4. Close-up of the unit, which consumes approximately 600 c. ft. of gas per hour

Fig. 1, shows a diagrammatic layout of the building in which the heat sources in the factory and offices are shown. Fig. 2 gives a cross-section through the heater and purification unit. It should be noted that towns gas is controlled for pressure drop by a governor, after which it passes into a retort

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system centrally disposed in the plant. In this is packed the purifying material known as "Carbocell." Thence the purified gas passes to the burner system.

On lighting up, the operative applies a light to the pilot jet, and the mains supply of gas to the burners will not pass even though the cocks are opened until this pilot is lighted, which opens a relay valve through the medium of a "Thermoperl" safety device. The burners heat up the "Carbocell" material in the retort. An axial flow fan drives the heated combustion products which are mixed with recirculated air and any ancillary air coming into the system from outside the building through ducting where it is vented into the building, at a controlled temperature.

Cost

The capital cost of this installation works out approximately at £680, including gas controls and safety devices. It must be borne in mind that the installation of this system eliminates the necessity for a boiler house, fuel store and chimney stack, the saving on which would in most instances go a long way to help cover the cost of the installation. With gas at 10d. per therm, the overall average cost of running this installation per hour amounts to 2s. 6d.

Although the products of combustion contain a small amount of water vapour, this has proved to be quite innocuous in so far as the operatives are concerned. To avoid the problems of condensation, the heater is turned off about 10 minutes before the fan so that the building is left with a neutral atmosphere when the factory closes.

Points to be noted include:

1. Within 10 minutes of lighting up, an adequate supply of hot air is being delivered.
2. Almost the maximum conversion of gas to heat possible takes place within the building, and there are no flue losses whatsoever.
3. The variation in sulphur content from one area to another is taken care of.
4. The claim is made that for workshops in which there are many openings and doors and windows which are alternately closed and opened, the hot air from the overhead distributors acts as a blanket against the cold air coming in from outside. There is no doubt that a flueless heater such as this offers many advantages as an industrial heating medium.

Developments are taking place in the ceramics industry with the object of firing ware. Here sulphur containing compounds from the combustion of towns gas can be extremely deleterious, and the direct produced pure atmosphere offers many advantages in economy and processing.

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THIS is an edited version of eight lectures given recently at the Northampton Polytechnic, London, under the auspices of the Head of the Applied Chemistry Department, Dr. J. E. Garside.

The contents include: Developments in Electrodeposition Processes and in Plant for Electrodeposition, by E. A. Ollard, F.R.I.C., F.I.M., of the British Non-Ferrous Metals Research Association; Phosphate Treatments for Iron and Steel, by H. A. Holden, M.Sc., A.R.C.S., D.I.C., A.I.M., of the Pyrene Co. Ltd.; The Protection and Decoration of Aluminium, by V. F. Henley, B.Sc., F.R.I.C., of W. Canning and Co. Ltd.; and Methods for the Protection of Magnesium Alloys, by W. F. Higgin, Ph.D., of Magnesium Elektron Ltd.

Three lectures dealing with the history and general principals, the composition and application methods and their industrial applications of vitreous enamel are included by W. E. Benton, M.Sc., of S. Flavel and Co. Ltd., S. Hallsworth of Metal Porcelains Ltd., and H. Laithwaite M.Sc.Tech., A.R.I.C., of Radiation Ltd.

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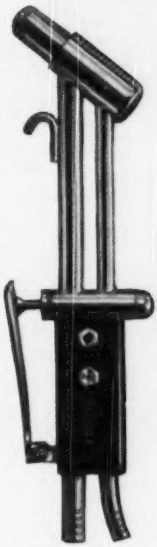

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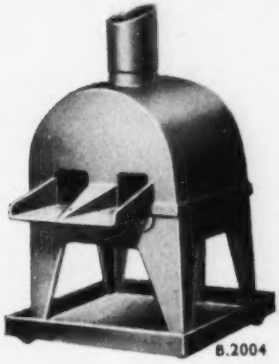

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How Public Services Depend on Gas

Schools—Transport—Street Lighting

MANY of the public services run by municipalities and other local authorities throughout the country depend to a great extent upon the use of gas as a fuel, and the more up-to-date the authority the more likely it is to make heavy demands upon its local gas works.

Gas in Schools

Perhaps it is in the schools that the use of gas is of particular importance. Not merely will it be used for heating—by radiators, panel or overhead heaters, fires or central heating—but now that school catering is such an important feature of our educational service, gas-fired large scale catering appliances have been and are being installed in many schools in all parts of the country. Catering appliances will also be found in the sections of the school devoted to domestic science training, together with water heaters, refrigerators and other domestic appliances. In the school laboratories gas equipment of many types is likely to be installed, from the well-known Bunsen burners to the latest type of furnace, while, if the school is really up-to-date, the cloakroom will be able to supply constant hot water from a gas water heater and be fitted with gas-heated drying cabinets.

Examples of the latest available appliances of all these types were shown on the Gas Council stand at the Public Works and Municipal Services Exhibition held recently at Olympia.

Other exhibits on the stand included appliances of interest in the transport services and for street lighting; a display showing the various road surfaces available by the use of road tar; a domestic section with emphasis on both gas and coke for the "smokeless fuel" kitchen; and such varied appliances as those for greenhouse heating, the drying of clothes and incineration.

Gas is still responsible for a large proportion of the nation's street lighting services. The exhibit at Olympia included three of the latest types of gas lamp, together with a model illustrating the effects of different types of lighting upon various road surfaces and an illuminated map demonstrates the correct spacing of lamp standards.

The transport section featured a profiling machine for metal cutting and a tool hardening furnace.

One of the more interesting of the appliances was the "Dryatherm" industrial clothes dryer (Radiant Heating Co. Ltd., London), which is fitted with hooks for twenty-four hats and coats and can be installed for the drying of clothes in cloakrooms on wet days. The dryer operates like a miniature central heating system and is most economical, burning only 6 to 7 c. ft. of gas an hour. For such public servants as policemen, postmen, roadmen and others who have to be on duty in the open in all weathers, this dryer will be found most valuable.

A Sterilising Sink

An exhibit which is proving popular for installation in school kitchens is the gas-heated sterilising sink (James Stott and Co. Ltd., London), of which already 1,500 have been supplied to educational authorities. It is an appliance which is of value to general catering firms, in addition to its use in school kitchens.

Hospital staffs and health authorities could find much of interest in a new baby feed sterilising "Prestige" pressure cooker (Platers and Stampers Ltd.) and in the incinerators for cloakrooms and lavatories.

A general view of the section dealing with equipment for transport and road services, including appliances for use in the maintenance of vehicles

A model demonstrating the use of different methods of street lighting for the various types of road

Another view of the stand, showing in the foreground the section dealing with gas - fired appliances for use in schools

SOME NEW PROPORTIONING CONTROLS

THE new "Teddington" Z.A. series of proportioning controls comprises a complete range of electrically operated proportioning valves, dampers and controllers for the automatic regulation of heating, air conditioning and refrigerating processes. This series augments the present range of modulating valves and controls and is introduced primarily to meet the requirements of applications where greater flexibility of installation is necessary than can be provided by the Electro-Hydraulic models having controlling element attached.

The use of these new controls makes it possible to install the proportioning unit to vary the flow of heating or cooling medium at a considerable distance from the controller, connection between the two being made by one three-core cable only. A combination of these units can be arranged to maintain a constant temperature or humidity from a single control point, from a single control point with high or low limit control, or to maintain compensated temperature control from two control points.

Although the following range of proportioning units and controllers meets most normal applications specially designed units adapted for use with fluids and gases are necessary for specific jobs.

Proportioning Units

The Model Z.A. proportioning valve is made in sizes up to 6 in. diameter whilst two way valves, single or double beat and three way valves are available for cold water, high and low pressure hot water, saturated steam, refrigerating brine, freon or ammonia.

The Model Z.B. proportioning torque unit is similar in design to Z.A. but has plain driving shaft for operating air duct louvres, boiler dampers, butterfly valves, multi-contact switches for controlling banks of electric heater batteries, etc.

The final shaft can be arranged to rotate through an angle of 180° in 60 seconds or in 120 seconds according to the requirements of the application, and the maximum permissible torque exceeds 150 lb. in. For operating dampers and ventilating louvres the driving shaft is fitted with a lever arm drilled to give the required angular rotation of the device to which it is linked.

Model Z.K. multi-contact unit resembles the above but is arranged as a multi-contact switch which can be coupled to operate in banks of one to ten switches adjusted to give any desired difference between steps, and can be arranged to give individual switch differential down to 1/20th of the differential of the thermostatic controller.

Thermostatic, pressure and humidity controllers are available to operate with the above units.

Compensated Control

A control system which will automatically regulate the inside temperature of a building in relation to the fluctuation of outside temperature, is efficient and will provide maximum fuel economy without loss of comfort conditions. This can be achieved by the use of two Model Z.D. thermostatic controllers: the phial of one being located to respond to changes in outside temperature and the phial of the other located to respond to changes in the radiator

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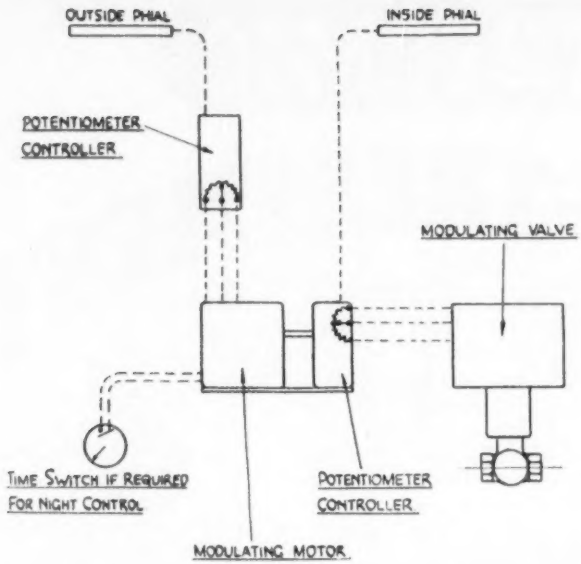

Fig. 1. Diagrammatic arrangement of Compensating Control

flow water temperature. The outside controller is wired to a Model Z.J. proportioning unit mechanically coupled to the range setting spindle of the inside controller (see Fig. 1). In the event of a fall in outside temperature the proportioning unit will automatically reset the radiator flow water control temperature to a higher level. Conversely, with a rise in ambient temperature the flow water temperature setting is lowered. A time switch may be wired into the control circuit to give inside flow temperature control at night only, and to automatically reset the flow

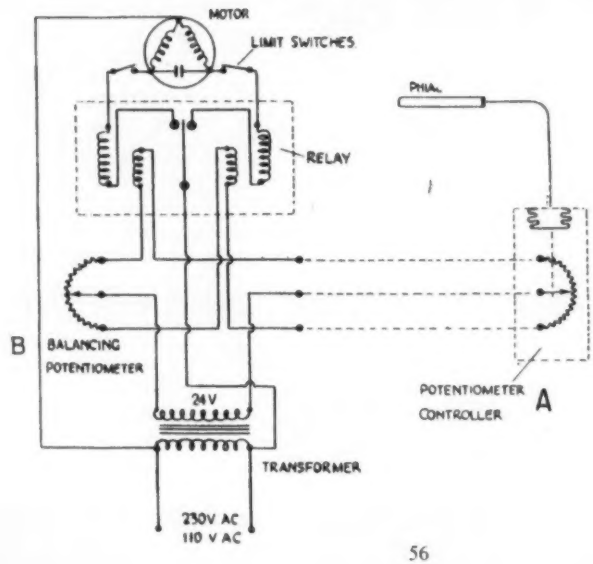

Fig. 2. Wiring diagram for Motorised Valve

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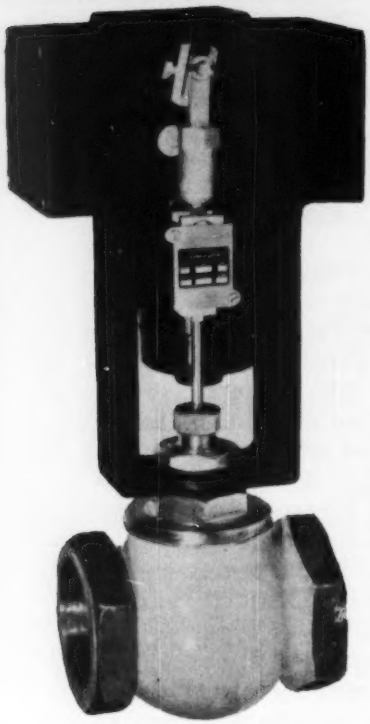

Fig. 3. The Proportioning Valve

control temperature to a lower setting at other times.

Construction

The operating torque of the proportioning unit is provided by a reversible, totally enclosed motor, coupled to a very high ratio gear box mounted in a robust cast main frame. In the Model Z.A. valve a sliding crank mechanism is attached to the final drive from the gear box to provide a readily adjustable vertical movement to suit the size of valve fitted. This sliding crank mechanism is fitted with an indicating pointer to indicate valve travel between fully opened and fully closed positions.

The vertical movement operating the valve is transmitted through a double acting overload spring assembly, to ensure tight shut off when the valve is closed without causing damage to the gear box or motor. A balancing potentiometer slider and a limit switch breaker are fitted to the other end of the final drive shaft, and the operation of these is described below. A step down transformer for the low voltage signal circuit and the motor reversing condenser are housed in a compartment on one side of the cast main frame, and the reversing relay and terminal block are housed in a similar compartment on the reverse side. The gear box, limit switch and potentiometer housing, relay and transformer compartments have easily removable cast inspection covers. These covers have machined joint faces to provide a tight seal against damp and corrosive action of surrounding atmospheres.

Operation

Referring to the wiring layout (Fig. 2), it will be seen that a change in temperature at the sensitive phial of controller "A" causes the potentiometer slider to move and thereby upset electrical equilibrium. A greater electrical potential appearing across one of the relay operating coils, the unbalanced magnetic force thus created causes a moving armature to close a pair of contacts. On

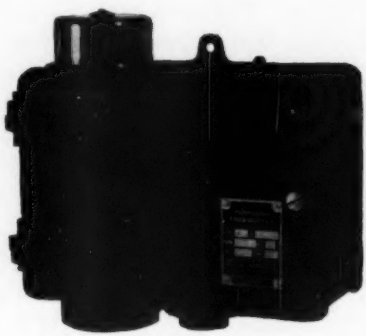

Fig. 4. The Motorised Valve

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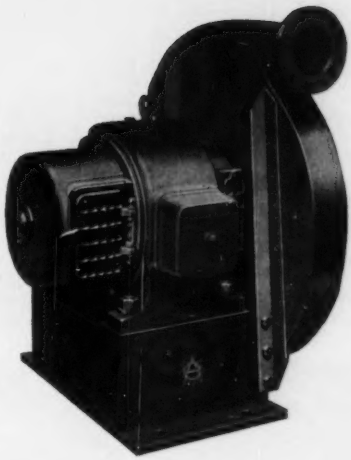

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closing these contacts complete the circuit to one field of the electric motor, which is thus energised to drive the valve in the required direction to off-set the initial cause of the change in temperature.

Whilst the valve spindle is moving the main driving shaft of the gear box is rotating, and with it the slider of balancing potentiometer "B." The rotation of this slider causes electrical equilibrium to the relay circuit to be restored, which in turn restores the position of the armature, thus opening the contacts and stopping the motor.

In the event of a change in temperature in the opposite direction the unbalanced voltage from the potentiometers actuates the balancing relay to close another pair of contacts, energising the motor to run in the opposite direction until electrical equilibrium is again restored.

As an additional safeguard against damage which might be caused by the interruption of the signal circuit, limit switches (opened by the action of an insulated projection attached to the final shaft) are arranged to come into operation if the final shaft makes an angular movement in excess of the 180° normally employed.

Provision has also been made for the manual operation of the valve spindle which might be necessary in the event of supply failure.

Further information may be obtained from British Thermostat Co. Ltd., Sunbury - on - Thames, Middlesex.

Wythenshawe.—The Altrincham undertaking (Manchester Group) of the North Western Gas Board has installed 115 gas appliances in a block of twenty shops and thirty flats on the Wythenshawe Housing Estate, Manchester. The installations included thirty S.3180 "New World" cookers, thirty No. 7B Morley 10 gal. capacity wash boilers, thirty-seven Ascot type R12/4 instantaneous water heaters, and eighteen No. 1502 enamelled De La Rue hot plates.

GAS SPEEDS RESTAURANT SERVICE

A RESTAURANT which caters almost exclusively for those people who appreciate interesting food, good service and individual attention is the Chatelain Restaurant, Gerrard Street, London W.1.

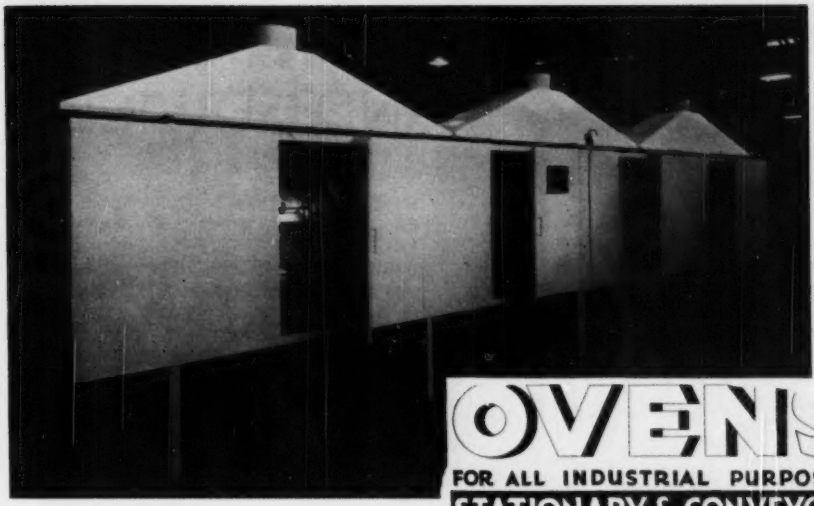
The proprietor, Monsieur Auguste, has a particular desire to please guests who visit his restaurant. He has a welcome for each, and happy suggestions for dishes of the day.

To assist in the smooth running of this restaurant, Père Auguste has modernised not only his dining-room and cocktail bar, but the important heart of any restaurant the kitchen. Radiation Ltd. have recently supplied gas-heated appliances for this, of which the double-oven Grosvenor range is the central feature. Monsieur Leo Martines, chef de cuisine, speaks very highly of this stove, which fits so adequately into a kitchen planned on pullman lines.

Welcome, too, is the Belgravia Minor hot closet for ensuring service of really hot dishes for the staff of chef waiters who are proud of their speed of serving.

The dining-room of the Chatelain Restaurant can seat 100-120 people comfortably

The Chef de Cuisine of the Restaurant in his kitchen at the Grosvenor gas range on which most of the cooking is done



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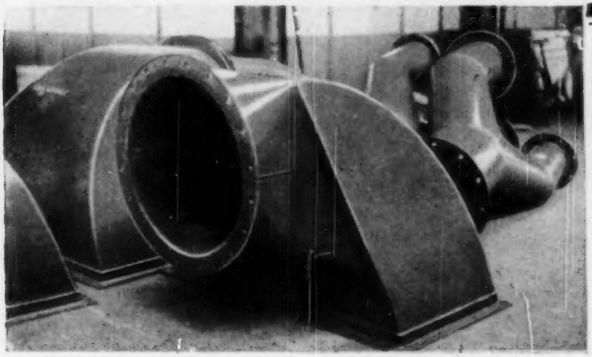

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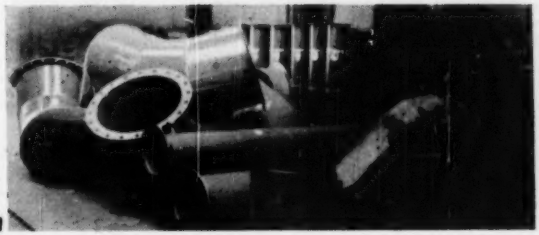
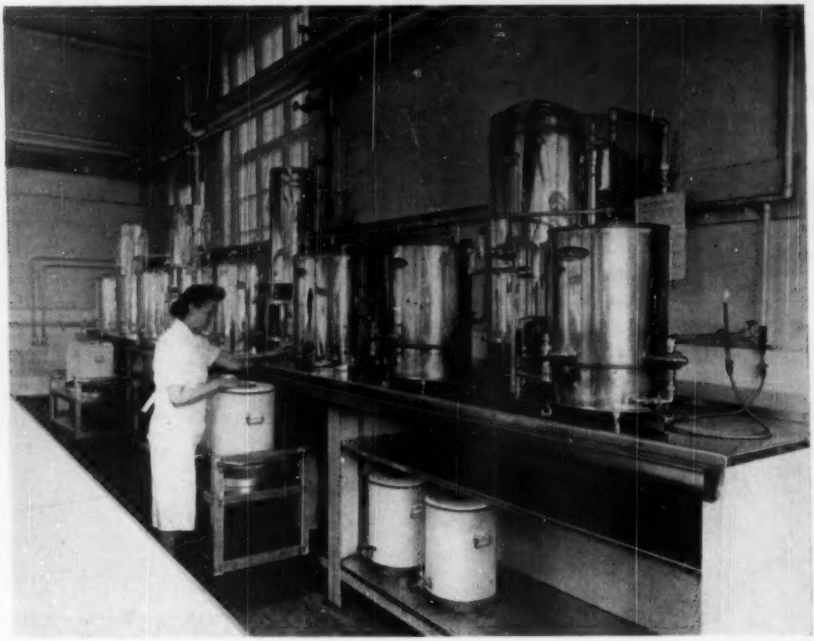


TEA MAKING AND SERVICE

WELFARE and catering officers will be interested in the recent plant installed for Rolls-Royce Ltd., Derby. This comprises three 2 gallon-a-minute water boilers, each fitted with two draw-off spouts, individually operated, which feed into the two 15 gallon "Stott" special type insulated urns, the latter being constructed of polished copper outer casing, chromium plated, with a pure nickel interior and fitted with a special stainless tea infuser, sugar insert and stirring paddle with collapsible handle. All these parts are removable for cleaning purposes. The urns are recessed on the underneath side and fit on to a plinth which enables the urn to be rinsed and the spout to be swung over the emptying gulley when being cleaned. At the outlet end of the counter there is a No. 3 Magna boiler fitted with a swivel spout and an extended draw-off tap. This works in conjunction with two milk warming urns constructed of stainless steel and fitted with thermostatic control.

The tea is made in the large "Stott" special type urns and the service multipots are mounted on rubber tyred Birmabright trolleys specially designed for the purpose. Milk is added, as a last operation, from the milk urns provided on the counter and the urns are topped up with boiling water from the Magna boiler.

At present, this plant is dealing with the brewing and supply of 100 gallons of tea, and the approximate time taken from the commencement of the



The recently installed "Stott" tea making and service plant, at the Derby works of Rolls-Royce Ltd.

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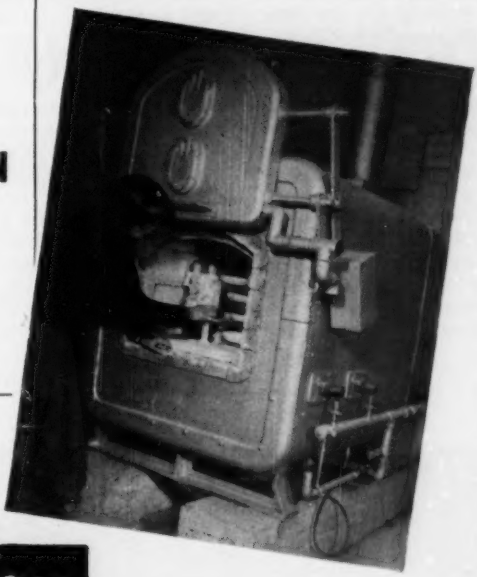

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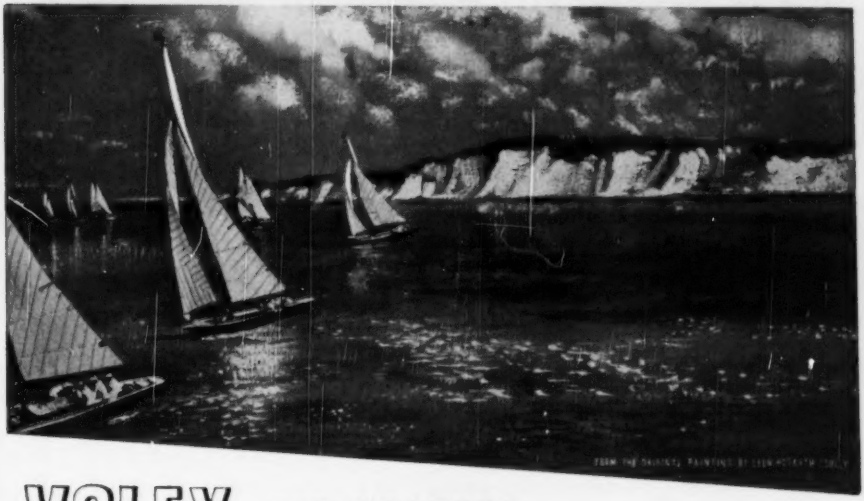

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operations to the last of the trolleys starting out on their rounds is three-quarters of an hour.

The height of the counter is arranged so that the tea is fed direct to the urn on the trolley, thus avoiding any lifting or manual work.

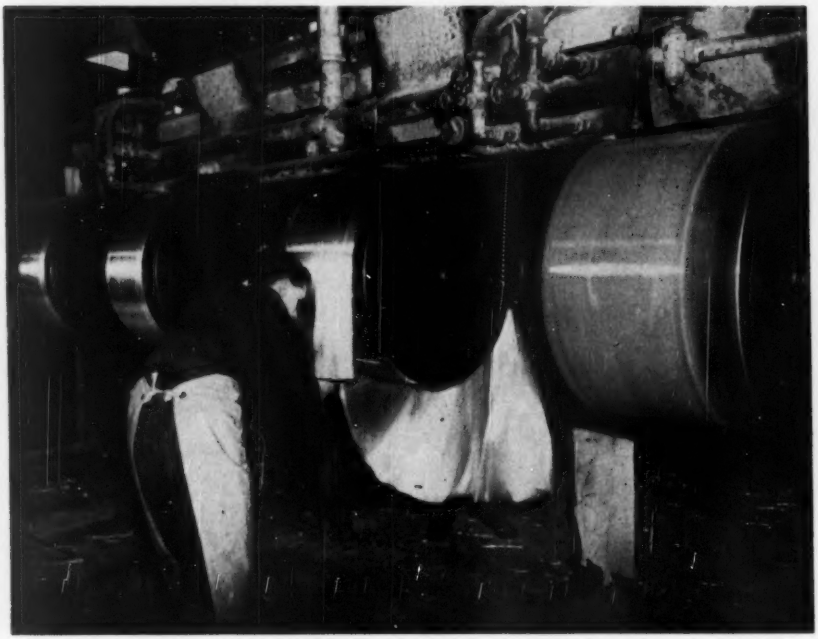
Storage space underneath the counter has been provided for the multipots when not in use, the upper shelf being used to take the lids and infusers of the tea infusing urns on the counter when being cleaned.

Access to the urns for cleaning purposes is provided by the use of a special pair of steps, which is not shown in the photograph.

This is a plant specially designed for a particular purpose. There are ten trolleys in use, each containing 5 gallon multipots, but by organising a staggered service the output can, of course, be increased.

The plant is capable of dealing with 100 gallons of tea at one making, serving approximately 1,700 people. The saving in time over the previous method of getting the trolleys away is approximately 3¼ hours.

The installation was planned and the equipment made by James Stott and Co. (Engineers) Ltd., Oldham.



The use of gas at the factory of Versil Ltd., Liversedge, Yorkshire, is illustrated here, where glass silk blankets can be seen being removed from rollers fitted beneath gas-fired glass melting furnaces

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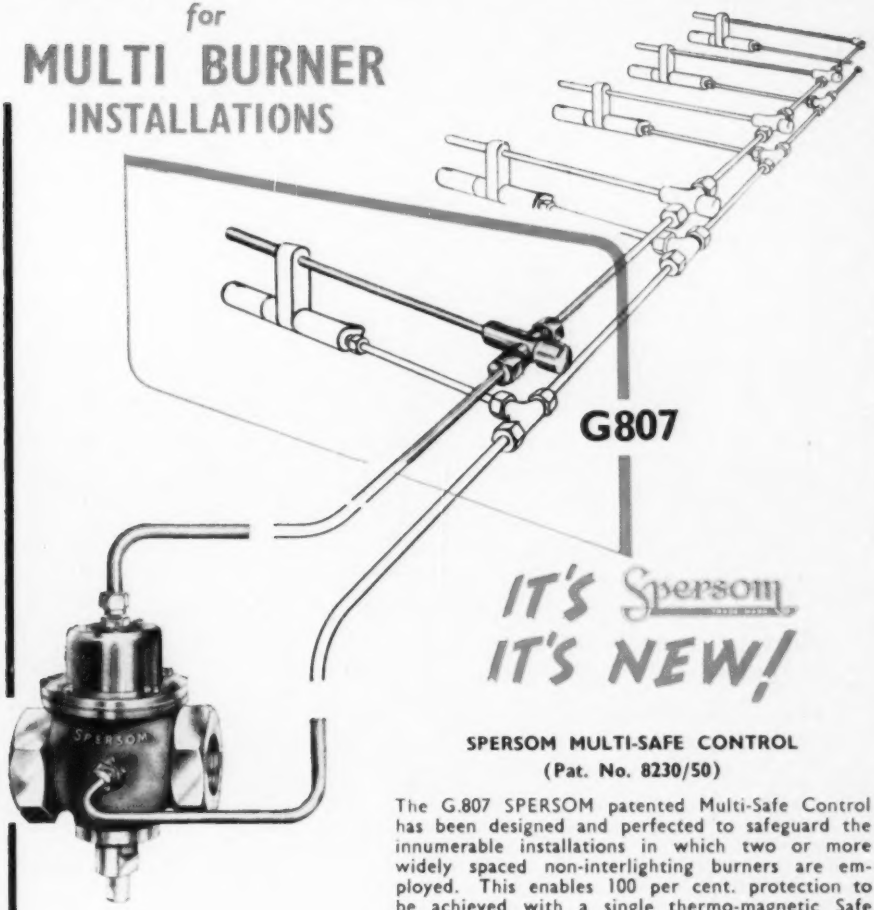

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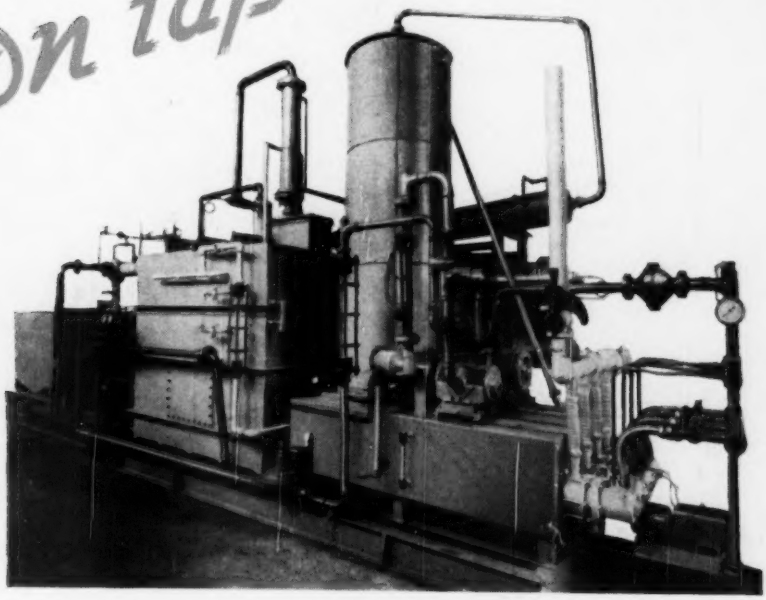
SPERSOM MULTI-SAFE CONTROL
(Pat. No. 8230/50)

The G.807 SPERSOM patented Multi-Safe Control has been designed and perfected to safeguard the innumerable installations in which two or more widely spaced non-interlighting burners are employed. This enables 100 per cent. protection to be achieved with a single thermo-magnetic Safe Control Pilot by the addition of one SPERSOM G.807 Multi-Safe Control and one pilot burner unit for each main burner. By utilising this system, should the flame fail at any one burner it will either be reignited by the pilot burner or, if the pilot burner has also failed, the G.807 Multi-Safe Control will cause the main gas supply to be cut off from the whole of the apparatus. We shall be pleased to forward our pamphlet upon request.

SPERRYN & CO., MOORSOM ST., BIRMINGHAM 6

NITROGEN

on tap—



Nitrogen—the ideal carrier gas for bright heat treatment and controlled atmosphere processing—can now be produced by the consumer for approximately one shilling per 1,000 cubic feet.

A "Hi-Nitrogen" generator produces 99% pure gas which is subsequently dried to a very low dew point, i.e. minus 70°F. The generators are self contained and highly efficient, heat of combustion being utilised to reactivate the carbon dioxide absorbent. The plant is continuously regenerative.

Generators are available in 10 sizes ranging from 500 to 20,000 cubic feet per hour.

Full details available on request.

THE INCANDESCENT HEAT CO. LTD

SMETHWICK · BIRMINGHAM

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